Contents

| Preface | vii |
|--|-----|
| Introduction: Necessity and Contingency | I |
| 1 Place and Matter | 12 |
| 2 Spaces | 31 |
| 3 Absolute Space | 50 |
| 4 Distance and Direction: (i) Primary Tests | 71 |
| 5 Distance and Direction: (ii) Secondary Tests | 99 |
| 6 The Geometry of Space | 116 |
| 7 The Dimensions of Space | 136 |
| 8 Past and Future | 157 |
| 9 Logical Limits to Spatio-Temporal Knowledge | 172 |
| 10 Times and the Topology of Time | 198 |
| 11 Time Measurement and Absolute Time | 212 |
| 12 Physical Limits to Knowledge of the Universe: (i) Horizons | 247 |
| 13 Physical Limits to Knowledge of the Universe: (ii) Past/Future Sign Asymmetry | 258 |
| 14 The Size and Geometry of the Universe | 280 |
| 15 The Beginning and End of the Universe | 296 |
| Index | 315 |